(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau





(43) International Publication Date 10 September 2004 (10.09.2004)

PCT

(10) International Publication Number WO 2004/077729 A2

(51) International Patent Classification7:

H04L

(21) International Application Number:

PCT/US2004/005257

- (22) International Filing Date: 23 February 2004 (23.02.2004)
- (25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data: 60/448,993

21 February 2003 (21.02.2003) US

- (71) Applicant (for all designated States except US): JOHN-SON CONTROLS TECHNOLOGY COMPANY [US/US]; 650 Waverly, Holland, Michigan 49423 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): BLAKER, David, A. [US/US]; 557 Bay Avenue, Holland, Michigan 49423 (US). VREDEVOOGD, Loren, D. [US/US]; 869 Maywood Avenue, Holland, Michigan 49424 (US).
- (74) Agent: TIBBETTS, Jean, M.; Foley & Lardner, 777 East Wisconsin Avenue, Suite 3800, Milwaukee, Wisconsin 53202-5306 (US).

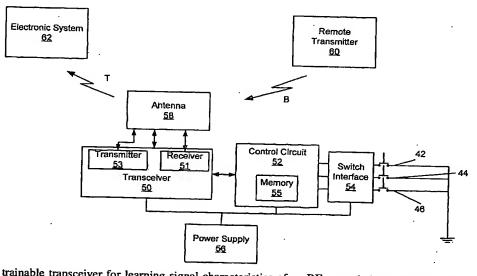
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

 as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ,

[Continued on next page]

(54) Title: TRAINABLE TRANSCEIVER AND METHOD FOR DETERMINING THE FREQUENCY OF A LEARNED CONTROL SIGNAL.



(57) Abstract: A trainable transceiver for learning signal characteristics of an RF control signal received from a remote control transmitter used to remotely actuate a device and for subsequently transmitting a modulated RF signal having the learned signal characteristics includes an antenna, a wideband receiver and a control unit. The wideband receiver is coupled to the antenna and is configured to receive an RF control signal from the remote control transmitter. The RF control signal includes a control code, a set of data characteristics and an RF carrier frequency. The control circuit is coupled to the wideband receiver and has a training mode in which the control circuit is configured to identify and store the control code of the RF control signal, to identify at least one data characteristics and to identify at least one RF frequency associated with the RF control signal based on the at least one data characteristic.

WO 2004/077729 A2

CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT,

- LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations

Published:

 without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.